

A GLOSSARY OF TERMS USED IN MICHIGAN FISHERIES WORK
(Helpful explanatory notes for secretarial use.)

- Access site - Usually publicly owned frontage on a lake or stream providing access to the water for boating and fishing.
- Adult - See Fish, Life Stages.
- Aerobic - Living or active, or occurring only in the presence of oxygen.
- Alevin - See Fish, Life Stages.
- Algae - Any of a group of single celled or filamentous plants (seaweeds, scums, etc.).
- Alkalinity - In fresh water it has been defined as the capacity of water containing other compounds for neutralizing strong acid to pH 4.5.
- Anadromous - Fish such as salmon which spend most of their life cycle in the Great Lakes or sea but return to rivers and streams to spawn.
- Anaerobic - Living or active in the absence of free oxygen.
- Aquaculture - The rearing of organisms (plant or animal) in water, either fresh water or salt water. The goal of aquaculture is commonly to provide cultured food products for consumption by man.
- Aquatic - Pertaining to water, either fresh water or salt water.
- Aquifer - A formation, or formations, that contain sufficient saturated permeable material to yield significant quantities of water to wells and springs.
- Artificial flies only - A term used in specifying that artificial flies are the only lure permitted for fishing in designated waters.
- Artificial reef - A man-made reef placed in barren deep water, off-shore, to provide cover, congregate fish and improve fishing success.
- Bathymograph (BT) - A torpedo shaped device lowered from the water surface for obtaining temperature with depth. The temperature record is etched on a piece of glass in the BT.
- Bayou - A backwater or sluggish area along the margin of a stream channel which does not receive the main current of the stream.
- Bedload - Refers to heavy or sand-sized particles that are in continuous contact with the stream bottom. Often moves slowly with the stream current.
- Benthos - Organisms that live on or in the stream bottom.
- Biomass - The total particulate organic matter present.
- Biota - The flora and fauna (plant and animal life) within a given area.
- Bloom - Refers to a peak growth phase of aquatic plants--usually algae.

- BOD (Biological oxygen demand) - A measure of the amount of organic material in the water that can be oxidized by micro-organisms, over a given period of time.
- Boom shocker - A wide stable work boat, capable of carrying a crew of four or five, and outfitted with booms rigged with electrodes that hang into the water and create an electrical field in front of the boat. Fish passing through the field are momentarily stunned to facilitate collection.
- Borrow pit - An area that has been excavated by removal of sand, gravel or other soils used for fill in road or other construction.
- Bottom sampler - Any instrument utilized to obtain a sediment sample from the bottom of a lake or stream.
- Bottom sediments - Sedimentary material of any origin found on or in the bottom of an ocean, river or lake.
- Breakwall - A structure placed in a lake to prevent or reduce shore damage by wave action.
- Brine - Water containing dissolved salts in excess of normal sea water concentrations.
- Brood stock - Adult fish retained at a fish hatchery for propagation.
- cfs (cubic feet per second) - refers to the number of cubic feet of water flowing past a given point in one second--approximately 450 gallons.
- Chemical reclamation - Refers to the chemical treatment of a body of water to remove existing fish populations so that it may be restocked with more desirable species.
- Chloride - Refers to sodium and calcium chlorides, reaching the stream from human use and road salting, and occasionally from deep wells.
- Coldwater fish - In Michigan this term usually refers to trout and salmon.
- Coliform bacteria - All aerobic and facultative anaerobic gram-negative, non-spore-forming bacilli which ferment lactose with gas formation.
- Community - Refers to an interacting population of various kinds of plant and animal species.
- Concentration - Refers to the weight of a constituent in water per unit volume of solution.
- Conductivity (water) - Refers to the ability of water to transmit an electric current in direct proportion to the amount of dissolved particles contained.
- Confidence limits (90%) - Provides a method of stating the degree of precision of an estimate. (Here the limits within which an observation will fall 90% of the time.)
- Confluence - The flowing together of two or more streams or the place of meeting of two streams.

- Consumptive - Refers to the consumptive use of water, or water that is lost to the system as a result of evaporation or transpiration.
- Creel census - A canvassing of the numbers of fishermen to obtain information on the size and numbers of fish species caught, time expended, locality, type of bait used, etc.
- Detritus - Finely divided settleable material, of organic or inorganic origin, which is suspended in the water.
- Discharge (streamflow) - Refers to the volume of water flowing past a given point in a specified unit of time.
- Dissolved oxygen - The amount of oxygen dissolved in water, usually stated in ppm (parts per million).
- Dissolved solids - The particles dissolved in water that are left behind when the water is evaporated away.
- Diurnal - Occuring daily or in daylight.
- Divergence - The horizontal flow of water in different directions from a common center line as exemplified by many upwelling areas.
- Dorsal - Pertaining to, located, or lying on the back, as the dorsal fin of a fish.
- Dredge and fill - Refers to the removal of soils or placing of soils or other materials in a waterway below the ordinary high water mark.
- Dystrophic lake - A lake having brown water (associated with high concentrations of humic acids), low calcium carbonate and low nutrient contents.
- Ecology - The interrelationships between living organisms and their environments.
- Ecosystem - A major environmental province which has some sort of coherent natural structure such as the sea, a forest or lake.
- Eddy - A circular movement of water which occurs in association with the passage of water by obstructions, when two currents pass each other in opposite directions or along the edge of a permanent current.
- Effluent (sewage) - The liquid portion of sewage after the floating and settleable solids have been removed.
- Electrofishing - A method of capturing fish, using an electrical generator and hand-held electrodes carrying about three to five amperes, in order to "stun" fish momentarily so they can be captured.
- Enrichment - Matter contributed to water that supplies nutrients which in most cases result in an increase in productivity.
- Environment - The climatic, soil related, and biotic factors that act upon an organism, or a community of organisms, to determine its form and survival.
- EPA - Refers to the Environmental Protection Agency.
- Erosion - A washing or wearing away of earth by water or wind.

- Estuary - A semi-enclosed coastal water body which has free access to the sea.
- Eutrophic - Waters which contain abundant levels of nutrients resulting in high levels of organic production.
- Eutrophication - Refers to the intentional or unintentional enrichment of water which results in increased biological production.
- Evapo-transpiration - A term expressing the combined loss of water to the atmosphere from water and plant surfaces.
- Exploitation rate - Refers to the percentage of fish in a population that are caught or removed over a fishing season or designated time period.
- Eyed egg - See Fish, Life Stages.
- Fecal coliform - Those coliform organisms present in the gut and feces of warm-blooded animals and which produce gas at $45.5^{\circ} \text{C} \pm 0.2^{\circ} \text{C}$.
- Fertilized egg - See Fish, Life Stages.
- Fingerling - See Fish, Life Stages.
- Fishing pier - A structure to fish from that is constructed from shore out into or over desirable fishing grounds.
- Fish, Life Stages -
- Spawn - Eggs of fish.
 - Green egg - Not developed to the stage of successful acceptance of sperm.
 - Ripe egg - Developed to the stage of readiness to accept sperm.
 - Fertilized egg - Has accepted sperm.
 - Eyed egg - First visible stage of embryo appears.
 - Sac fry or alevin - The stage of life where yolk sac is still attached.
 - Fry or swim-up fry - Stage of life after absorption of yolk sac up to about one inch in length.
 - Fingerling - Generally warmwater fish are one to four inches, coldwater fish are two to five inches long.
 - Yearling - Warmwater fish over four inches and one year of age; coldwater fish over five inches and one year of age.
 - Parr - Advanced salmonid fry or fingerling showing juvenile (parr) markings, (stage before smolting).
 - Smolt - Stage of life of anadromous fish when ready to migrate out to the Great Lakes or sea from the spawning stream.

- Jack - Pre-adult male salmon.
- Adult - Fish having reached age of spawning capability.
- Flow duration - Refers to the percentage of time a given flow is equalled or exceeded.
- Flushing time - The time required to remove or reduce to some specified concentration, by natural current and/or tidal action, a contaminant which has been introduced into a lake, river, stream, harbor, bay, or estuary.
- Food chain - The sequence of organisms, each of which provides forage for the next in larger organism in the chain. Simple food chains are rare in nature, and it is more realistic to speak of food webs which involve complex feeding inter-relationships among the organisms of a community.
- Fry or swim-up fry - See Fish, Life Stages.
- FWPCA - Federal Water Pollution Control Agency.
- Fyke net - Device used to capture fish. Made up of a mesh material supported by hoops on a frame. The hoop net becomes a fyke net when wings six feet deep by thirty or more feet long are added to the mouth; sometimes a leader of 100 or more feet in length is employed to bisect the angles of the wings and guide fish into the mouth and into the trap part of the net; also, trap net.
- Gaff - A large hook with a handle, used to land fish.
- Gaging station - A particular location on the stream, or reservoir, where systematic observations of water levels or discharges are recorded.
- Game fish - A desired target fish species, sought by sports fishermen.
- Game fish breeder - Term applied to private individuals engaged in raising game fish for sale.
- Gill net - Device used to capture fish; a mesh usually made of relatively light-weight thread of cotton, linen or nylon. Typically weighted to fish on the bottom, although some are used as "floaters" or designed to fish through all depths from the bottom to the surface. Gill nets normally capture fish by "gilling" them; the fish passes its head through a mesh but neither further passage of the body nor withdrawal of the head is permitted.
- Glacial drift - All the material (including picked up, mixed, disintegrated), transported and deposited through the action of glaciers.
- Gradient - The upward or downward slope of the streambed, usually expressed in feet per mile.
- Green egg - See Fish, Life Stages.
- Greenbelt zoning - Zoning ordinances that limit lot size, size and location of buildings, placement of septic systems, and restricts removal of streamfront vegetation, and the filling and dredging on river uplands.
- Groundwater - Water within the earth that supplies wells and springs, and runoff from the zone of saturation.

- Habitat - Type of surroundings (or characteristics of a land and/or water area) where a particular species of plant or animal is found.
- Hatch - Refers to the emergence of various insect species that compose an important part of the diet for fish species.
- Highwater mark - An established reference point which indicates the highest elevation, along a shoreline, reached by the high tide.
- Hoop net - See Fyke Net.
- Hydrograph - A graph showing stage, flow, velocity, or other property of water with respect to time.
- Hydrographic map - Map showing descriptive features of lakes, rivers or other bodies of water.
- Hydrography - The science which deals with the measurement and description of the physical features of oceans, lakes, rivers, estuaries, etc.
- Hydrology - The science which deals with the cycling and character of water upon the earth.
- Hypolimnion - The deep water of a lake which underlies the thermocline.
- Impoundment - A body of water formed by a man-made obstruction on a stream, usually a dam (reservoir).
- Index - Refers to a ratio or other number derived from a series of observations and used as an indicator or measure.
- Indicator species - A species of organism which is characteristic of a certain type of environment; e.g., a species of plankton that is indicative of a certain water mass or a species of benthic invertebrate indicative of a sedimentary type.
- Infiltration rate - Refers to the time necessary for water to pass through pores in the soil.
- Jaccard index - Used in biology to mathematically measure the degree of similarity of two species lists; one of the faunal resemblance indices.
- Jack - See Fish, Life Stages.
- Limnology - The study of inland waters.
- Loading - Refers to an input of material that results in a higher concentration than is normally present.
- Lowhead barrier - A structure placed in a stream to prevent migration of undesirable species of fish, but constructed low enough to permit passage of salmon and trout.
- Macrophytes - Refers to large plants; often used in reference to rooted aquatic plants.
- Macroplankton - Planktonic organisms within the size range of one mm to one cm.

- Marginal - Refers to the lower limit of qualification or acceptability for a given plant or animal species.
- Marl - A calcareous clay or mixture of clay particles, calcium carbonate particles and shell fragments (also calcium carbonate). Marl sediments occur in the sea and also under special conditions in lakes.
- Marsh - An area of soft, wet land.
- Mesoplankton - Plankton within the size range of 0.5 cm to 1.0 cm. This term is most commonly used to indicate planktonic organisms of all sizes which are found at mid-depths.
- Metro-fishing - Recreational fishing in, or easily accessible to, metropolitan areas.
- Microplankton - Planktonic organisms within the size range of 60 microns to 1.0 mm.
- Model - Refers to mathematical expressions used to define some aspect of the physical, chemical, and biological make-up of an environment or population.
- Nocturnal - Occurring at night or in the dark.
- Nutrient - Substances (chiefly nitrate and phosphate compounds) that provide nourishment for aquatic organisms.
- Oligotrophic - Water bodies (especially lakes) which contain low supplies of nutrients and hence have low levels of organic production.
- Parameter - A consistent attribute of a system, or characteristic of a population; a guideline within established limits.
- Parasite - An organism which lives on or within its host, and obtains its nourishment at the expense of the host. A "good" parasite will not kill its host, although the host is often weakened to the point that it becomes subject to disease or predation.
- Parasitism - A relationship between two organisms in which one organism lives on or within its host and obtains its nourishment at the expense of the host.
- Parr - See Fish, Life Stages.
- Pathologist - One who interprets and diagnoses the changes caused by diseases in tissues.
- Periphyton - Refers to primary producers in an aquatic system, chiefly algal organisms that attach to surfaces (rocks, stems, leaves) and convert dissolved nutrients into food matter by photosynthesis.
- Photosynthesis - The elaboration of organic matter from carbon dioxide and water, utilizing light as an energy source in the presence of chlorophyll. The process results in the release of molecular oxygen.
- Phytoplankton - The plant constituents of the plankton community.
- Pike marsh - A marsh connected to a lake where suitable water levels and protection from larger fish are maintained for pike spawning and rearing.

- Plankter - A single planktonic organism.
- Plankton - Organisms in the aquatic realm which drift passively or swim weakly. Some planktonic organisms are able to traverse wide distances vertically, but are at the mercy of currents for horizontal movement.
- Population estimate - Refers to a fish survey using a mark-and-recapture technique in order to determine the number of individuals in a measured stream segment or lake.
- Pool-riffle ratio - Refers to the relative abundance of deeper areas of a stream (pools, holes) that provide resting places for trout and of shallow areas of gravel substrate (riffles) where production of trout food organisms is generally high. According to P. R. Needham (1940), "The better type of trout stream, both as shelter for fish and for angling, has about 50 percent of its area made up of pools and 50 percent of its area made up of riffles."
- Pound net - A trap in which the top is not closed with mesh. It extends from the bottom to a few feet above the surface and is composed of a leader, a somewhat heart-shaped pound, and a rectangular bowl, crib or pot. A pound net is usually staked out in water between 50 and 80 feet in depth; rarely as deep as 90 feet. This type of impounding device is used in the inshore fisheries of all of the Great Lakes to take a wide variety of fish.
- Primary sewage treatment - Refers to the removal of most floating and settleable solids by mechanical means.
- Production - Refers to the increase in biomass produced in a lake or stream segment (generally controlled by the amount of nutrient matter available, temperature and sunlight) in a given period of time.
- Riffle - Shallow area of gravel substrate in a stream, where production of trout food organisms is generally high causing a broken-water type flow.
- Rip-rap - A layer of rock applied to a sloped bank to prevent erosion.
- Ripe egg - See Fish, Life Stages.
- Rough fish barrier - A structure placed in a river or stream to prevent migration of undesirable fish species.
- Rubble - Rough or water-worn stones of various sizes, but generally large enough to cause some turbulence in streamflow, especially in shallow areas.
- Sac fry - See Fish, Life Stages.
- Salinity - A measure of the total amount of dissolved salts in water.
- Sea wall - A wall or embankment to protect a shoreline from erosion.
- Secchi disc - A white, black or combination of white and black panelled disc used to measure transparency of water. The disc is lowered to a point where it is just visible and that depth is recorded as the Secchi disc value for that particular water column at the time of observation.

Secondary sewage treatment - Removal of colloidal and dissolved organic matter, usually under aerobic conditions, by biological-oxidation-decomposition, in addition to primary treatment.

Sediment - Particulate organic and inorganic matter which lies on the bottom of a water body.

Sediment basin - A pool or depression designed to allow material to settle out.

Seine - Drag nets of various lengths, depths, and mesh sizes used for taking bait minnows for sale, and for seining coarse fishes from quiet back waters, sloughs, and flood ponds. Sometimes seines are hauled parallel to shore, and at other times they are pulled from deeper waters to the beach or bank. Long nets are effectively laid parallel to shore from a boat and then drawn in by means of a rope of appropriate length at each end.

Sewage lagoon - A large open holding reservoir where waste water is introduced for stabilization by plant and animal communities.

Shoal - A submerged object (such as a sand bar), generally less than six feet deep, which is near enough to the surface to create a hazzard to navigation in lake and river impoundments.

Smolt - See Fish, Life Stages.

Snagging - A method of fishing where fish are caught with hooks designed to hook the fish in the body by a jerking motion.

Spawn - See Fish, Life Stages.

Spawn station - a portion of a lake or stream designated for intensive study and observation of spawning activities.

Spawn-taking - Manually removing spawn (eggs) from fish for artificial breeding.

Species diversity - A numerical approach used in quantitative ecology to evaluate the community structure of a group of organisms, incorporating the number of species and their relative abundance.

Sport fishing - Refers to recreational fishing.

Sport trolling - A recreational method of fishing where the lure is trailed from a moving vessel.

Stability - Refers to the property of streamflow.

Stage - The height of the water surface above an established datum plane.

Standing crop - The biomass present per unit area or per unit volume in the water of interest at the time of study.

Stratification - The physical state of a fluid in which two or more horizontal layers are arranged from the top in the order of increasing density.

Stocking - Refers to the "planting" of hatchery-reared fish in public waters.

- Stormwater runoff - The portion of precipitation that runs overland directly to a waterway or collecting system, particularly from impervious urban areas.
- Stream improvement structure (device) - Any one of various types of structures constructed in stream beds to provide fish cover or alter flow to improve habitat or prevent bank erosion.
- Student's t test - A statistical procedure to test whether the observed samples could have reasonably been drawn from identical populations.
- Substrate - Refers to the nature and composition of the stream bottom.
- Taxon - A name applied to a group or entity in a formal system of nomenclature.
- Temporal - Relating to time.
- Thermocline - A vertical negative temperature gradient which may be found in the ocean and many lakes, and leads to stratification of the water body. The thermocline is an area of rapidly decreasing temperature bonded above and below by a layer of slowly decreasing or constant temperature. Thermoclines are often seasonal, and several may form over the same water column, although they usually will merge with time.
- Trap net - A modification of a fyke net in which rectangular shape, floats, sinkers, and spreaders have been substituted for hoops. They are adaptable for fishing in deeper waters than hoop nets. A "deep trap" may have a pot 40 or more feet tall; one or two pots may be present.
- Transpiration - Emission of watery vapor from the surface of plant leaves, resulting in loss by evaporation.
- Trawl net - A mesh bag towed through the water at slow speed. The basic shape is more or less conical. The net mouth is held open and the depth of fishing regulated by frames, blades or depressors.
- Tributary - A stream feeding a larger stream or reservoir.
- Trophic level - The position which an organism occupies in a food chain or web. Some trophic levels are: primary producer, herbivore and carnivore.
- Turbidity - Relative state of muddiness or roiliness, with stirred-up sediment and/or particulate matter.
- Turbulent flow - A point in the velocity at a given stream flow that varies erratically in magnitude and direction.
- Warmwater fish - Generally used in referring to Michigan species other than trout or salmon such as muskies, pike, bass, perch, bluegills, etc.
- Watershed - A region bounded peripherally by water draining ultimately to a particular watercourse or body of water.
- Weir - Stationary fish trap which acts as a barrier to fish movements and leads fish into traps. In the Great Lakes region they are employed in tributaries to arrest up-stream spawning runs of the sea lamprey; also used for studying fish movements.

Whirling disease - A contagious fish disease affecting trout up to three inches in length. Causes fish to swim in circles; fatal to a high percentage of fish infected.

Wild fish - Fish spawned and reared in a natural environment.

WQI - Water quality index - A numerical representation of several parameters which combine to constitute a measurement of water quality.

WRC - Refers to the Michigan Water Resources Commission.

WWTP - Refers to waste water treatment plant.

Zooplankton - The animal components of the plankton community.

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